



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/822,377

04/12/2004

Matthew J. Murray

9314-66

2854

54414

7590

11/06/2006

MYERS BIGEL SIBLEY & SAJOVEC, P.A.

P.O. BOX 37428

RALEIGH, NC 27627

EXAMINER

JACKSON, BLANE J

ART UNIT

PAPER NUMBER

2618

DATE MAILED: 11/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/822,377

Applicant(s)

MURRAY ET AL.

Examiner

Blane J. Jackson

Art Unit

2618

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 and 21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 10, 12, 14, 16, 18, 19 and 21 is/are rejected.
- 7) ☒ Claim(s) 5, 7-9, 11, 13, 15 and 17 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Arguments*

The examiner appreciates the applicant's Remarks filed 18 August 2006 in view of the first Office Action. However, upon further consideration of the broad claim language, a second Non-Final rejection is made of claims 1, 14, 19 and 21 in view of Nasuno and Baum and additionally Berger for claim 18.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 6, 10, 12, 14, 16, 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nasuno et al. (US 5,990,736) in view of Baum (US 6,396,000).

As to claims 1, 14 and 19, Nasuno teaches a wireless communications device comprising:

A power amplifier configured to transmit information to a wireless communications network during a first time interval and configured to avoid transmitting information during a second time interval (figures 1 and 2, column 3, lines 14-43, power amplifier mounted on a multi-layer printed circuit card comprising a modulation circuit for

Art Unit: 2618

modulating data and outputting a modulated signal to an antenna, data modulation such as TDMA),

a circuit substrate coupled to the power amplifier (figures 1-4, column 4, lines 24-42),

A power source configured to provide power to the power amplifier (column 5, lines 3-12, voltage supply circuit 4b includes via holes and a circuit pattern (9b) on the jth layer and a capacitor (10b) on the PCB (100)), and

A first and second conductors coupled to the power amplifier and to the power source (figures 2 and 3, column 5, lines 16-25, circuit patterns (9a) and (9b) on the jth layer are shielded by circuit patterns (32 to 34), connected to a grounded terminal, the two patterns provide power to the two amplifier transistors (1a and 1b)).

Nasuno teaches shielded micro strip circuit patterns to provide power to the transistor amplifier, figure 1, but does not teach both circuit patterns or first and second conductors having respective overlapping and non overlapping portions on the substrate respectively to define first and second partially overlapping zigzag patterns relative to one another.

Baum teaches differential twisted pair cabling has been used to reduce RFI emissions, column 1, lines, 16-27. Baum further discloses similar performance to cancel EMI emissions is achieved on a printed circuit board comprises a first and second conductors on a substrate having respective overlapping and non overlapping portion extending between a lower layer of the substrate and an upper layer of the substrate to

Art Unit: 2618

define first and second partially overlapping zigzag patterns relative to one another, figures 4 and 5, column 4, line 63 to column 6, line 14.

Since Nasuno teaches a printed circuit arrangement to shield the voltage supply circuits to the power amplifier, it would have been obvious to one of ordinary skill in the art at the time of the invention to improve the shielded power circuits of Nasuno with the twisted pair circuit path of Baum to cancel RFI and EMI emissions from the power coupling.

As to claim 2 with respect to claim 1, Nasuno teaches the first and second conductors comprise first and second etch runs coupling the power source to the power amplifier (figure 2, column 5, lines 21-25, circuit etch patterns (32 and 34) provide shielding and ground return and circuit patterns (9a and 9b) provide direct current to the power transistors).

As to claim 3 with respect to claim 1, Baum of Nasuno modified teaches a wireless communications device according to claim 1 wherein the circuit substrate comprises a printed circuit board or a flexible circuit board (figure 5, column 6, lines 15-34, a two sided printed circuit board).

As to claims 4 and 16 with respect to claims 1 and 14, Baum of Nasuno modified teaches the first conductor is configured to conduct a first current in a first direction to the power amplifier and the second conductor is configured to accept a second current

Art Unit: 2618

in a second direction, opposite the first direction from the power amplifier (column 6, lines 1-14, a differential pair of traces).

As to claim 6 with respect to claim 1, Baum of Nasuno modified teaches the respective over-lapping portion of the first conductor extends on a lower layer of the circuit substrate beneath the respective over-lapping portion of the second conductor on an upper layer of the circuit substrate (figure 5, column 5, lines 9-67).

As to claim 10 with respect to claim 6, Baum of Nasuno modified teaches wherein the overlapping and non-overlapping portion of the first and second conductors alternately extend between the lower layer and the upper layer (figure 5, column 5, lines 25-37).

As to claim 12 with respect to claim 6, Baum of Nasuno modified teaches the lower layer and the upper layer comprise layers that are either separated by one or more other layers or are immediately adjacent layers (figure 5, column 5, lines 9-24, single layer PCB).

Claim 20 is cancelled.

As to claim 21, Nasuno teaches a wireless communications device comprising:

A power amplifier configured to transmit information to a wireless communications network during a first time interval and configured to avoid transmitting information during a second time interval (figures 1 and 2, column 3, lines 14-43, power amplifier mounted on a multi-layer printed circuit card comprising a modulation circuit for modulating data and outputting a modulated signal to an antenna, data modulation such as TDMA),

A circuit substrate coupled to the power amplifier (figures 1-4, column 4, lines 24-42),

A power source configured to provide power to the power amplifier (column 5, lines 3-12, voltage supply circuit 4b includes via holes and a circuit pattern (9b) on the jth layer and a capacitor (10b) on the PCB (100)), and

A first and second conductors coupled to the power amplifier and to the power source (figures 2 and 3, column 5, lines 16-25, circuit patterns (9a) and (9b) on the jth layer are shielded by circuit patterns (32 to 34), connected to a grounded terminal, the two patterns provide power to the two amplifier transistors (1a and 1b)).

Nasuno teaches shielded micro strip circuit patterns to provide power to the transistor amplifier, figure 1, but does not teach both circuit patterns or first and second conductors having respective overlapping and non overlapping portions on the substrate at an intermediate portion between the power source and the power amplifier.

Baum teaches differential twisted pair cabling has been used to reduce RFI emissions, column 1, lines, 16-27. Baum further discloses similar performance to cancel EMI emissions is achieved on a printed circuit board comprises a first and second

Art Unit: 2618

conductors *that extend generally along a longitudinal axis of a layer of a PCB* having respective overlapping and non overlapping portion extending between a lower layer of the substrate and an upper layer of the substrate at an intermediate portion between the power source and the power amplifier, figures 4 and 5, column 4, line 63 to column 6, line 14.

Since Nasuno teaches a printed circuit arrangement to shield the voltage supply circuits to the power amplifier, it would have been obvious to one of ordinary skill in the art at the time of the invention to improve the shielded power circuits of Nasuno with the twisted pair circuit path of Baum to cancel RFI and EMI emissions from the power coupling.

Claims 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nasuno et al. (US 5,990,736) in view of Baum (US 6,396,000) and Berger, "Hearing Aid Compatibility".

As to claim 18, Nasuno teaches a printed circuit board comprising:

First and second etch runs on a circuit substrate coupling a power amplifier to a power source (figures 2 and 3, column 5, lines 3-25, voltage supply circuit (4b) provided to the amplifier transistors via shielding circuit patterns (32 to 34) and circuit patterns (9a and 9b)).

Nasuno does not teaches the first and second etch runs are configured to conduct first and second respective opposing currents to/from the power amplifier to reduce electromagnetic coupling from the first and second etch runs.



Art Unit: 2618

Baum teaches the performance provided by a twisted pair of differential cabling applied to a circuit card comprising first and second etch runs configured to conduct first and second respective opposing currents to/ from the power amplifier to reduce electromagnetic coupling from the first and second etch runs, figures 5, column 1, lines 16-27 and column 5, line 9 to column 6, line 14.

Since Nasuno teaches a printed circuit arrangement to shield the voltage supply circuits to the power amplifier, it would have been obvious to one of ordinary skill in the art at the time of the invention to improve the shielded power circuits of Nasuno with the twisted pair circuit path of Baum to cancel RFI and EMI emissions from the power coupling.

Nasuno modified teaches a differential circuit board circuit to cancel EMI emissions but do not teach the reduction of electromagnetic coupling to a hearing aid proximate to the wireless communication device.

Berger teaches RF energy from digital cellular telephones via the digital format (TDMA) or battery current surges, keyboard scanning and display currents can produce significant emissions, which will add noise to a t-coil mode hearing aid, pages 123 and 127. Consequently, Berger discloses a measurement approach to identify the EMI interference to support reduction of such, page 125, Hearing Aid RF Immunity measurements.

It would have been obvious to one of ordinary skill in the art at the time of the invention to realize the application of the modified cellular telephone circuits of Nasuno

Art Unit: 2618

modified would be effectively applied to the situation explored by Berger to reduce EMI interference in hearing aids.

***Allowable Subject Matter***

Claims 5, 7-9, 11, 13, 15 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Blane J. Jackson whose telephone number is (571) 272-7890. The examiner can normally be reached on Monday through Friday, 8:30 AM-6:00 PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban can be reached on (571) 272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2618

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

A handwritten signature in black ink, appearing to read "Blair J. Johnson", is located below the main text block.